# LIBERIA SUNFISH 3D
# PRE-STACK TIME & DEPTH MIGRATION
# MULTI-CLIENT 3D SURVEY, 7800 km²

## ACQUISITION PARAMETERS

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|---|---|
| **Acquisition date:** | **January – June 2013 (estimated)** |
| Dual Source: | Clustered airgun arrays – 4240 in² |
| Source Interval: | 50m per subsurface line |
| Streamer Length: | 7200m x 12 x 100m |
| Number of Channels: | 576 per streamer - 6912 per shot |
| Group Interval: | 12.5m |
| Record Length: | 10500ms |
| Sample Interval: | 2ms |
| Multiplicity: | 72 fold at 6.25m bin interval |
| Recorded Bin Size: | 6.25 x 25m |
| Primary Navigation: | DGPS for the vessel; RGPS for front and tail buoys |
| Recording Instrument: | Sercel Seal 408 v5.2 |
| Cable Type: | Sercel sentinel solid |
| Cable Depth: | 10 meters +/-1 meter |
| Filters: | 2 Hz (6 dB/octave) – 200 Hz (370 dB/octave) |
| Gun Depth: | 8 meters +/- 0.5 meter |
| Shooting Direction: | Northeast / Southwest |
| Acquired By: | M/V Polarcus Asima |

## PRELIMINARY PRE-PROCESSING

- Input SEGD data
- Merge navigation with seismic trace headers
- Output navigation merge shot ordered tapes (SEGY)
- Apply start of data (SOD) correction
- Debubble and convert to zero phase
- Resample from 2ms to 4ms
- Noise attenuation (swell, linear & first break)
- True azimuth multiple elimination (TAME™)
- Output shot ordered TAME™ tapes (SEGY)
- Spatial anti-alias filter, trace drop to 25m group
- Velocity analysis
- Spherical divergence gain correction
- Shot and channel amplitude compensation
- High resolution Radon de-multiple
- Cold water statics
- Q compensation (phase only)
- Residual noise attenuation (if needed)
- Output Radon CDP gathers (SEGY)

## PRELIMINARY TIME MIGRATION and POST STACK PROCESSING

- Fast-track post-stack migration, filter and scale (output 12.5x25m, SEGY)
- Grid and sum data to 12.5x25m x 72 fold
- Kirchhoff pre-stack curved ray migration velocity analysis
- Output migration velocities
- Kirchhoff pre-stack curved ray migration (Output 25x25m, 36 fold)
- Output 3D bin sorted tapes (SEGY) – 36 fold
- Automatic velocity picking update at every CDP location
- Output 3D velocity trace volume (SEGY)
- High resolution Radon de-multiple
- Output migrated gathers with NMO & Radon (SEGY) – 25x25m; 36 fold
- Mute and stack
- Output raw migration – 25x25m (SEGY)
- Post-stack trace interpolation – 12.5x25m (SEGY)
- Output angle stacks (Near 0-15, Mid 15-30, Far 30-45 degrees) – 12.5x25m (SEGY)
- Noise removal, filter, scaling & interpolation
- Output processed migration – 12.5x25m (SEGY)

## AVAILABLE TIME DELIVERABLES

- Raw field data – shot ordered
- Field data with navigation in the trace headers – shot ordered, unedited at 2ms
- TAME™ / shot ordered – 12.5x25m, 72 fold
- Radon CDP gathers without NMO – 12.5x25m, 72 fold
- Pre-stack time migrated CDP gathers without NMO – 25x25m, 36 fold
- Pre-stack time migrated CDP gathers with NMO & Radon – 25x25m, 36 fold
- Fast-track migration – interpolated to 12.5x25m
- Raw migration – 25x25m
- Angle stacks (Near, Mid and Far) - 12.5x25m
- Far weighted pseudo-gradient - 12.5x25m
- Processed migration - 12.5x25m
- Migration velocities (ASCII) (500x500m grid)
- Stacking velocities (ASCII) (500x500m grid)
- 3D stacking velocity trace volume – 12.5x25m (SEGY)
- 3D ETA velocity trace volume – 12.5x25m (SEGY)
- Processed source-receiver navigation (UKOOA)
- Post stack navigation – bin center (UKOOA)
- Workstation-ready tapes available in SMT, Landmark, and GeoQuest

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## PRELIMINARY DEPTH MIGRATION and POST STACK PROCESSING

**Build Initial Velocity Model**
- Build 3D initial model from 3D PSTM velocity volume
- Estimate VTI anisotropy parameters and calibrate to wells (if available)

**Kirchhoff PSDM**

**Anisotropy estimation**

**Iterations II-IV – Kirchhoff PSDM & Tomography Update**
- Input 25x25m, 36 fold, 10.5 seconds
- Output 50x50m, 36 fold, 12000m depth, 10m depth step
- 3 passes of Tomography to define sediment velocity volume
- Tomography inversions: 200x200m
- Interpretation

**Iterations V – Kirchhoff PSDM & Fine Grid Tomography Update**
- Input 25x25m, 36 fold, 10.5 seconds
- Output 50x50m, 36 fold, 12000m depth, 10m depth step
- 1 passes of Tomography to define velocity volume
- Tomography inversions: 100x100m
- Output Final Depth Model – 12.5x25m (SEGY)

**Final Kirchhoff PSDM**
- Input 12.5x25m, 72 fold, 10.5 seconds
- Output 25x25m, 36 fold, 12000m depth, 5m depth step
- Residual moveout correction
- Output Depth Gathers – 25x25m (SEGY)
- Stack
- Output Raw Migration **–** 25x25m (SEGY)

**Noise Removal, Filter and Scaling**

**Post-stack Trace Interpolation**
- Output Processed Migration **–** 12.5x25m (SEGY)

## AVAILABLE DEPTH DELIVERABLES

- Kirchhoff pre-stack depth migrated - raw stack (in depth) – 25x25m
- Kirchhoff pre-stack depth migrated - processed stack (in depth) – 12.5x25m
- Kirchhoff PSDM gathers without residual NMO (in depth) – 36 fold, 25x25m
- Final velocity volume (in depth) – 12.5x25m
- Interpreted water bottom (WB) horizon (ASCII)

*The processing flow and parameters published herein are the anticipated flow and parameters for the survey and TGS will use commercially reasonable efforts to follow this flow and parameterization. However, the foregoing notwithstanding, TGS reserves the right to modify the processing flow and parameters as needed to adjust for timing, testing, and new technologies.*

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